Appendix. B.2.1

Site Layout

Attachment B.8
Site Notice
Punch Industries
Revised IPC Licence Application

CONTENTS

Section

Appendix. B.8.1

Newspaper Notice

XX1 - V1

Irish Examiner
Tuesday 09.05.2006

DES-BENZ ONLINE
ELSE

TOM MURPHY

Legal Notices

APPLICATION TO THE ENVIRONMENTAL PROTECTION AGENCY FOR THE REVIEW OF AN IPC LICENCE

Notice is hereby given in accordance with section 87(1)(a) of the Environmental Protection Agency Acts 1992 and 2003, that Punch Industries Limited, Wallingstown, Little Island, Co. Cork, Reg. No. 127 will submit information to support the determination of an IPC licence review for Class 12.2.2: the manufacture or use of coating materials in processes with a capacity to make or use at least 10 tonnes per year of organic solvents, and powder coating manufacture with a capacity to produce at least 50 tonnes per year, not included in paragraph 12.2.1 This review is being undertaken to accommodate alterations to emissions to sewer, to update the licence in light of changes at the installation and to incorporate the requirements of the Protection of the Environment Act 2003, as appropriate. The reference number of this review in the Register of Licences is 764. A copy of the application for the review of the IPC licence and such further information relating to the application as may be furnished to the Agency in the course of the Agency's consideration of the application will, as soon as practicable after receipt by the Agency, be available for inspection or purchase at the headquarters of the Agency (Tel: Local 1890 33 55 99 or 053 - 60600).

Legal Notices

In the Matter of
RADSINSKI LIMITED
(In Voluntary Liquidation)
FORMERLY MUNTHEX LIMITED

And in the Matter of
THE COMPANIES ACTS 1963-2005

Notice is hereby given that the Creditors of the above named company which is being voluntarily wound up are required on or before the 30th day of June 2006 being the day for the purpose fixed by the undersigned Michael McAteer the liquidator of said company to send their names, addresses and particulars of their debts or claims and the names of their solicitors, if any, to the undersigned and if so required by notice in writing from the said liquidator or by his solicitors or personally to come in and prove the said debts or claims at such time and place which shall be specified in such notice or in default thereof, they will be excluded from the benefit of any distributions before such debts are proved.

Signed: MICHAEL McATEER
Date: 9th May, 2006
Liquidator

FOSTER McATEER,
32 Upr Mount St,
Dublin 2.

Legal Notices

Objectstar International (Ireland) Limited, having its registered office at c/o Brennan Gowerney & Co., Kildress House, Pembroke Row, Lower Baggot Street, Dublin 2, having ceased to trade, and having no assets or liabilities, has resolved to notify the Registrar of Companies that the Company is not carrying on business and to request the Registrar on that basis to exercise his powers pursuant to Section 311 of the Companies Act, 1963 to strike the name of the Company off the register.

Dated this the 8th day of May, 2006

BY ORDER OF THE BOARD
ALEX GUIRA
Director

EMPLOYMENT AGENCIES ACT 1971

Notice of intention to apply to the Tanaiste and Minister for Enterprise, Trade & Employment for a licence under the above Act. We Brightwater Support Services Limited carrying on business at 36 Merrion Square, Dublin 2, hereby give notice of intention to apply for a licence under the above Act to carry on the business of an employment agency at the premises specified below:

36 Merrion Square,
Dublin 2.

NOTICE TO

Appendix. B.8.2

Notice to Planning Dept.

Punch Industries,
Wallingstown, Little Island, Co. Cork, Ireland.
tel: +353 (0)21 4353601 fax: +353 (0)21 4354392
email: info.littleisland@punchindustries.com
www.punchindustries.com

The Secretary,
Planning Department,
Cork County Council
Model Farm Road,
Cork

09-May-2006

RE: Application to the EPA for a review of IPC Licence no 127

Dear Sir / Madam,

In accordance with section 87(1)(a) of the EPA Acts 1992 and 2003. Please note that Punch Industries (formerly Glanmire Industries Ltd), Wallingstown, Little Island, Co Cork intend to apply to the E.P.A for a review of our existing IPC Licence (Reg No 127) under section 90 of the EPA Acts 1992 and 2003. The class of activity is 12.2.2: the manufacture or use of coating materials in processes with a capacity to make or use at least 10 tonnes per year of organic solvents and powder coating manufacture with a capacity to produce at least 50 tonnes per year.

This review is being undertaken to accommodate alterations to emissions to sewer, to update the licence in light of changes at the installation and to incorporate the requirements of the Protection of the Environment Act 2003, as appropriate.

The activity at Little Island is located at National Grid reference 174231 East, 171828 North.

A copy of the review application may be inspected at or obtained from the Agency at Ardavan, Co Wexford as soon as is practicable after receipt by the Agency of the application for the new licence

Yours faithfully,

David Hartley
Operations Manager

cc: Gerry Clancy, Technical Manager, gclancy@punchindustries.com

encl: Newspaper Notice 9 May, 2006

Attachment F.1
Treatment Abatement and Control Systems

Punch Industries
Revised IPC Licence Application

CONTENTS

1. ABATEMENT EQUIPMENT

The following is a description of the abatement equipment used by Punch Industries at the Little Island facility.

Waste Water Treatment Plant (WWTP): Waste water is flocculated, filtered and pH adjusted before discharge to sewer.

The WWTP is controlled for pH on an on going basis. There is also automatic level and flow control. There is weekly / daily process control through analysis of samples of treated effluent.

Treated wastewater is discharged to sewer through emission point reference SE1(E2A).

There are two principal Waste Streams entering the WWTP.

1. Shoe Care Waste: Principally occurring from washouts and similar waste from the production of shoe care and household consumer items. The treatment consists of a batch treatment process consisting of pH adjustment with consequent chemical precipitation of the resulting flocculent. This is followed by bag filtration separation and pH adjustment to neutral. The consequent effluent is passed through a bucket filter prior to discharge to the foul sewer. The remaining sludge is sent off site for disposal. Schematic as per Appendix F.1.1
2. Colour Catcher Waste: A process that limits the quantity of effluent produced through continuous recycling of treatment solutions with eventual pH neutralisation of the remaining effluent is employed to reuse as much of the active ingredient as possible and limit resultant effluent discharged to the WWTP. However further on site treatment through the current batch treatment process does not seem to be a viable option. Schematic as per Appendix F.1.2

Current / Historical Problems

At the time of the original IPC Licence application in 1996 the bulk of production consisted of Shoe Care products with the consequent effluent being treatable in house prior to discharge. The Colour Catcher product (Fabric Care) was launched in 1996, but production was sub-contracted outside until pilot trials began on site in 1998. A processing plant was built at that time and the process was approved by the Agency (16/03/99). Over time increasing volumes of production has changed the balance of the effluent. Increasing production volumes of this product has necessitated the building of a second processing plant in 2005. These two processing plants have not been run simultaneously to date. However this option is part of the current licence application. Production of the Colour Catcher product has doubled each year since 1998 in parallel with a steady decline in Shoe Care products. Hence the dilution effect of the volume of effluent from the more traditional products on the volume of Colour Catcher effluent has decreased, in particular over the last 2 years.

The control of pH, Suspended Solids and Flows have historically not been a serious problem. However past results indicate that Punch Industries have an ongoing problem staying consistently within the limits for the other parameters of the 1996 IPC Licence principally COD, and to a lesser extent Total Nitrogen and Ammonia. Trended results show the current situation of exceeding the COD limit of 15,000 with values nearer to 30,000 being recorded. The license was previously amended (15/07/98) to allow BOD's on emissions to sewer to be monitored on an annual basis since COD provided a better basis for effluent control.

2. CONTROL AND ABATEMENT EQUIPMENT

Details of control and abatement equipment employed at Punch Industries is contained in Annex 1. Schematics of the following control equipment is presented in appendix F.1

- Waste Water Treatment Plant
- Abatement in Colour Catcher Processing Plant

3. POTENTIALLY ABNORMAL EVENTS AND CONTROL OF ABNORMAL SITUATIONS

The Colour Catcher neutralisation plant is effectively a batch operation in respect of treatment of effluent. There is significant holding capacity in the neutralisation tank. Regarding start up and shut down there is no specific action regarding neutralisation plant operation except to ensure that there are sufficient quantities of acid and caustic in place to ensure proper operation of the neutralisation system.

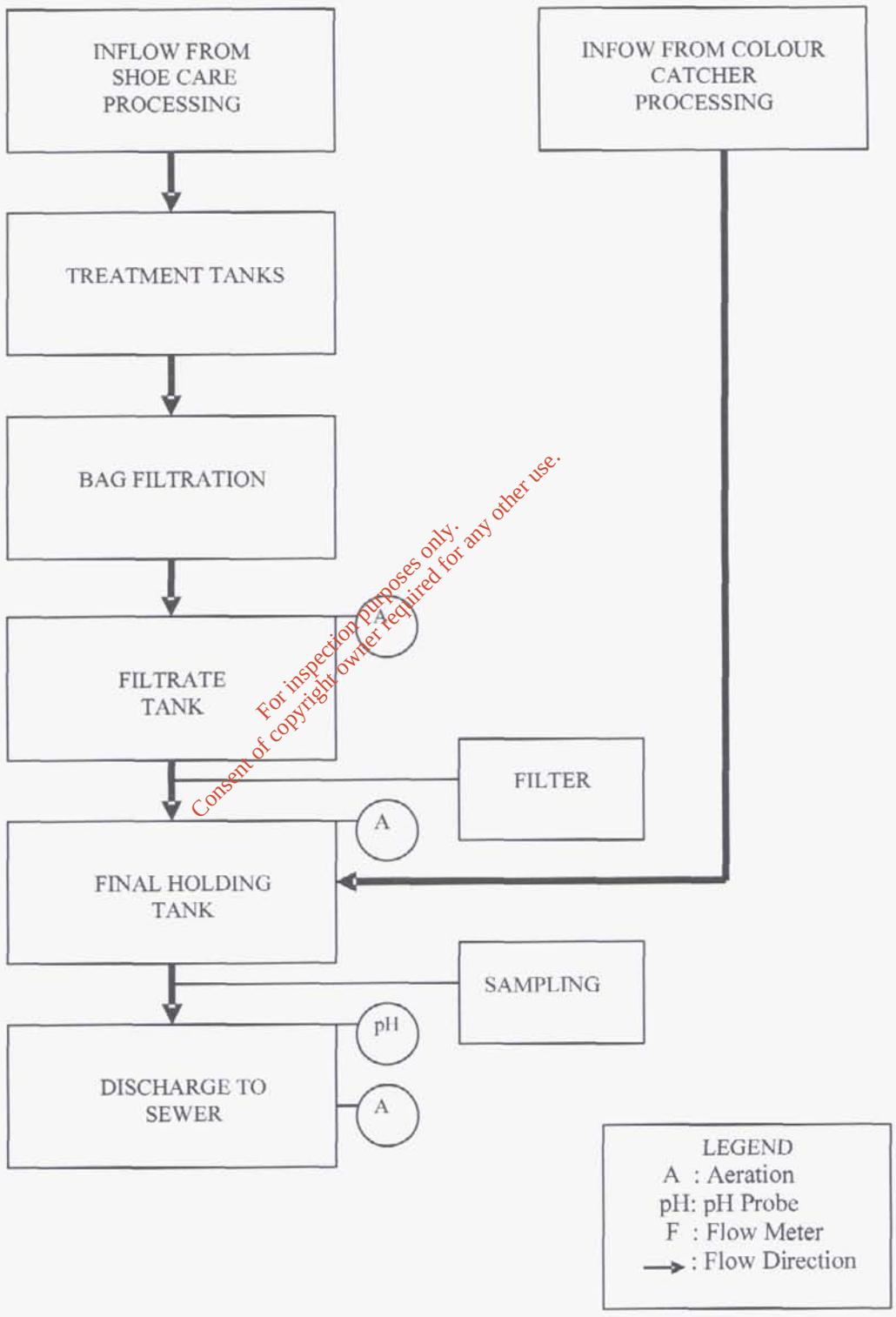
The Shoe Care Waste Treatment plant is also effectively a batch operation in respect of treatment of effluent. There are two treatment tanks with significant holding capacity. There is no specific action regarding start up and shut down of the plant.

Table E.3.1 describes potentially abnormal events and control of abnormal situations that may occur with the effluent treatment activities as they are currently operated.

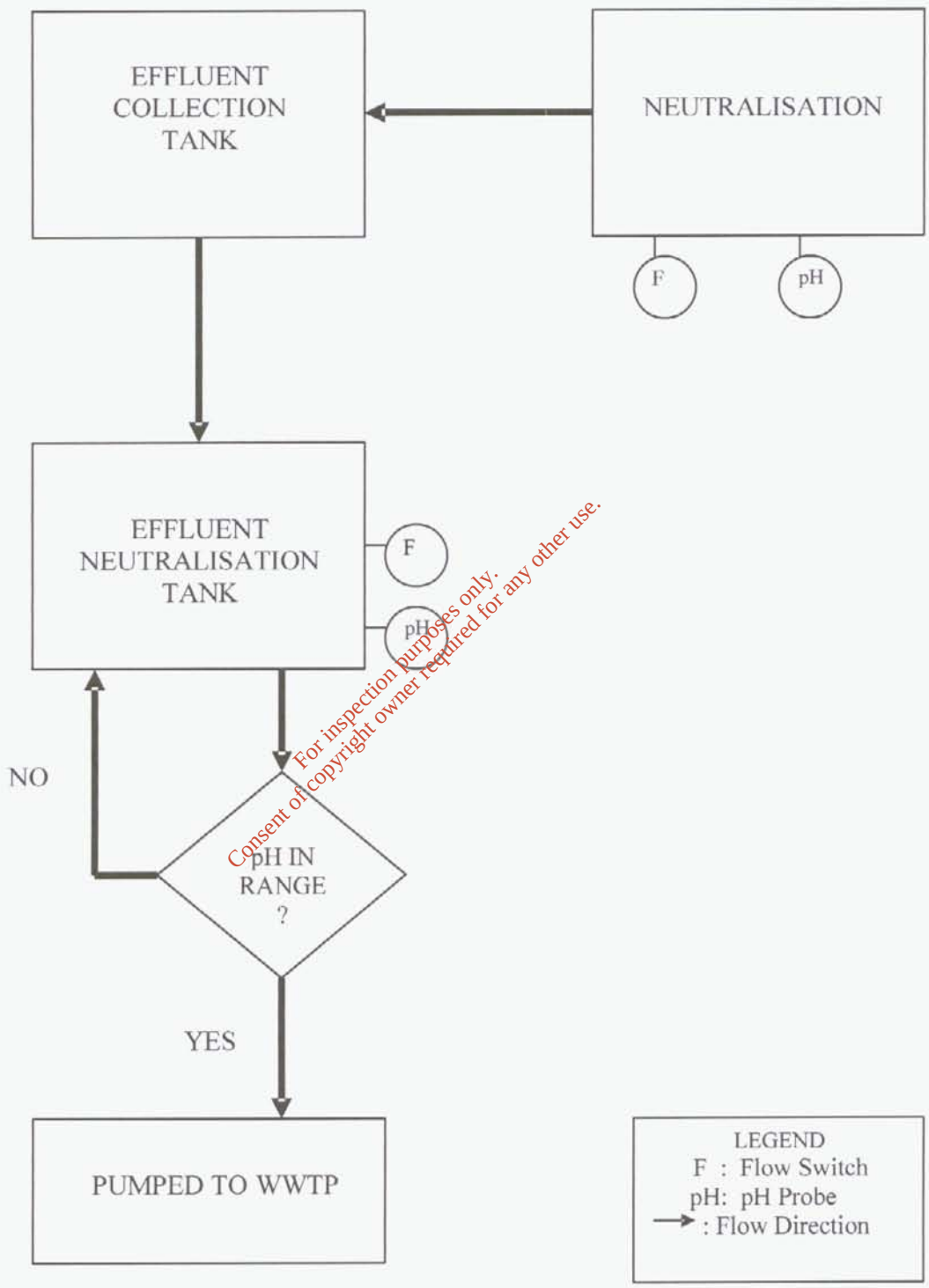
ABNORMAL EVENT	CONTROL OF ABNORMAL EVENT	AUTOMATIC / MANAUAL
Insufficient floc formation	Waste from Shoe Care area is re-circulated for further flocculation	Manual
Final Effluent is outside of Licence pH range	Shut down of final pump out to Emission point	Automatic (detection of out of specification pH)
Insufficient room in Final Holding Tanks for neutralised Effluent from Colour Catcher Effluent Neutralisation Tank	Shut down of pump to Final Holding Tanks in Effluent Treatment area	Automatic High Level Detection switches fitted to Final Holding Tanks causes shut down of pump out.
Loss of Neutralisation system in Colour Catcher effluent Neutralisation Tank	Shut down of pump to Holding Tanks in Effluent Treatment area	Automatic (detection of out of specification pH)
Loss of flow meter control of pump out	Shut down of pump out to Emission point.	Manual
Sudden spillage to waste water treatment area of out of specification effluent.	Shut down of pump out to Emission point.	Automatic (detection of out of specification pH)

Table E.3.1 describes potentially abnormal events and control of abnormal situations

Appendix F.1.1 Waste Water Treatment Plant



Appendix F.1.2 Abatement in Colour Catcher Processing Plant



Attachment I.3
Assessment of the Impact on Receiving Sewer

Punch Industries
Revised IPC Licence Application

CONTENTS

Section **Page No**

1. NAME OF SEWAGE UNDERTAKER

The name of the sewage undertaker is Cork County Council.

1.1 Agreement or Permission of Undertaker

Currently Punch Industries has an interim agreement with the Sanitary Authority Cork County Council regarding the discharge of trade effluent from its facility at Little Island pending the review of its IPC Licence. A copy of this letter is provided in Appendix I.3.1 to this section.

2. FURTHER TREATMENT UNDERTAKEN

The Cork City Council foul sewer system discharges to the Carrigrennane Sewage Treatment Plant located 3.5 km to the east of the Punch Industries Plant. This is an Sequential Batch Reaction (SBR) Extended Aeration Process consisting of primary and secondary treatment. At the Carrigrennane Sewage Treatment Plant there are two main influent streams: -domestic sewage and industrial effluent. The trade effluent from Punch Industries forms part of the industrial effluent stream. The industrial effluent receives further physical and chemical treatment.

3. POSSIBLE REACTIONS OF EMISSIONS WITH OTHER EFFLUENTS

The effluent from Punch Industries activities does not contain any substance that is likely to create a reaction of any significance if in contact with other effluents discharged to the sewer. There have been no incidents related to reactions in the receiving sewer system reported to Punch Industries

4. EFFECTS OF TRADE EFFLUENT DISCHARGES

It is not considered likely that there is any adverse impact of trade effluent form Punch Industries activities on either sewer maintenance activities or sewer integrity. The industrial sewer into which the effluent discharges is designed to take industrial effluents of a wide variety in composition.

It is recognized that there have been occasional instances of discharges that have not been compliant with the IPC Licence emission limit values or the interim agreement with Cork County Council. However these are of short duration and are infrequent and therefore not likely to have any adverse impact on the receiving sewer infrastructure. More importantly, the effluent discharged from Punch Industries is within the IPC Licence range of 6 to 9.

The assessment of the Impact of the Sewage discharge on the receiving plant was undertaken by Enterprise Ireland in June 2005 as follows:

4.1 Respirometry Testing:

A test method based on an International Organisation for Standardisation test (ISO 8192) for the measurement of *inhibition of oxygen consumption by activated sludge* was used. This test was used to determine if the trade effluent caused acute toxicity/biological inhibition to the microbes in the receiving treatment plant. A sample using activated sludge from the receiving local authority treatment plant at Carrigrennane was also carried out on nitrifying bacteria.

The effluent was also tested against activated sludge from Osberstown WWTP, Naas, Co Kildare. This municipal treatment plant was chosen as it was known to be working well and producing a fully nitrified final effluent. This also provided some information on the possible effects of the effluent

The full text of the report is presented in Appendix I.3.3 but the main conclusions are as follows:

- Punch Industries are currently licensed to discharge up to 5m^3 of trade effluent per day to the local authority sewer. .The estimated Dry Weather Flow in the sewer is 85,000 m^3 per day (source Cork City Council). This is made up of approx 50% domestic and 50% industrial effluent. Based on the company discharging up to 7.5 m^3 / day the maximum daily hydraulic load to the sewer from Punch Industries would represent about 0.02% of the domestic dry weather flow to the Carrigrennane WWTP.

- Based on the results obtained using the Carrigrennane activated sludge the Inhibition Threshold found (20% v/v) is 1000 times higher than the maximum concentration of Punch Industries trade effluent in the sewer (0.02% of the domestic dry weather flow) at a discharge rate of 7.5 m^3 / day.

This indicates that the Punch Industries would have a miniscule effect on the operation of the Sewage Treatment plant. It is proposed that Respirometry testing is undertaken annually to ensure that there are no significant changes in the effect of the effluent on the Sewage Treatment plant.

5. NATURE OF THE FINAL EFFLUENT ON RECEIVING WATERS

The final discharge point from Carrigrennane Sewage Treatment Plant is into the River Lee via a deep water channel at Marino Point. A screening process to examine the effects of the undiluted trade effluent on the receiving waters was undertaken by Enterprise Ireland using Skoptalmus (turbot) on the same sample as that used for the Respirometry testing. This gave a result of 100% mortality occurring at 5.6% V/V and no mortality occurring at 3.2% v/v. This report is included as Appendix I.3.4. This represents the effect on the receiving waters if the effluent were discharged undiluted in the case of a complete failure of the sewage treatment plant.

Appendix. I.3.1

Letter of Agreement

RECEIVED : 16- JUNE - 05

Comhairle Chontae Chorcaí
Cork County Council

Environmental Department,
Inniscarra Laboratories,
Inniscarra,
Co. Cork.

Tel. No: (021) 4532700
Fax No: (021) 4532777

Web: http://www.corkcoco.com/

Mr G Clancy Technical Manager
Punch Industries Limited,
Wallingstown,
Little Island,
Co. Cork,

Dear Ger

I refer to our correspondence on the interim increase in limit values to the discharge to sewer from your plant in Little Island. Your correspondence states that you are applying for a review of IPC Licence (Reg No 27).

Confirmation of your current connection status to the Carrigrenane Wastewater Treatment Plant can be made by phoning or writing to Mr David O' Keeffe, Senior Executive Engineer at the Glashaboy Water Treatment plant [021 4821433].

The Sanitary Authority will allow the interim increase subject to the requirements outlined in your letter of the 27-5-2005 being fulfilled.

As I am taking up a new position within the Council, I will not be dealing with future correspondence in relation to this file. The new contact person is Mr Macdara O' Hici acting senior executive officer, at Environment Department, Inniscarra [021 4532700].

Yours Sincerely

Dr Mary Stack
Senior Executive Scientist
10.06.05

Punch Industries Limited,
Wallingstown, Little Island, Co. Cork, Ireland.
tel: +353 (0)21 4353601 fax: +353 (0)21 4354392
email: info.littleisland@punchindustries.com
www.punchindustries.com

Punch

SENT 27-MAY

Dr. Mary Stack,
Senior Executive Scientist
Environmental Department,
Cork County Council,
Inniscarra Laboratories,
Inniscarra,
Co Cork

27-May-2005 IPC Licence Ref: 127

Dear Dr Stack,

Thank you for our meeting of May 13th, 2005 on Punch Industries and subsequent discussions concerning an agreement on interim limit changes to the Punch Industries discharges to Sewer in Little Island prior to the review of our IPC Licence (Reg No 27).

Attached is our proposal concerning an interim agreement on the discharge of trade effluent by Punch Industries Ltd to the sewer connected to the Carrigrenane Wastewater Treatment Plant. The proposed changes in discharge limits as per your request are presented in Section 9 Discharge to Sewer format including daily and annual loadings.

Punch Industries Ltd agree to perform Toxicity testing within the next 3 months as discussed and arrangements are being finalised with Enterprise Ireland for sampling and testing for early June in this regard. In addition it is agreed to analyse for dangerous substances as per S.I 12 2001, analyse for Fats, Oils and Grease's, install a grease removal system and an accompanying maintenance programme for this unit.

As per our discussions we agree to the Volumes on Flow, limits on BOD, COD, Suspended Solids, pH, TN, Ammonia, Toxicity and FOG's as defined overleaf. As discussed we have formally applied for a review of our IPC Licence this week. To this end we have initiated a study to determine if there are analytical interferences that may cause us to breach our licence limits. I will forward the results of this investigation when it is complete and as per your suggestion make a further proposal if necessary. I note that TN fulfilled your requirements but an Ammonia limit appears on our IPC licence. These proposed interim limits are based on a review of the historical trends for these parameters. In addition a study of further in-house effluent treatment options may necessitate a request to increase flows to 7.5m^3 from a daily flow of 5.0 m^3 , for now we do not propose any change in flows except to discharge over 24 hours rather than 10 hours if this meets with your approval.

I would appreciate if you could confirm that the conditions and limits overleaf are acceptable to the Sanitary Authority and confirm that the sewer in question is connected to the Carrigrenane Wastewater Treatment Plant.

Again many thanks for your time.

If you have any queries on any of the above please do not hesitate to contact me.

Yours sincerely,

Gerry Clancy
Technical Manager
gclancy@punchindustries.com

cc. Stephen McCarthy, EPA Office of Environmental Enforcement

Limit Values for Process Effluent to Sewer

Emission Limits

Emission Point Reference no : S1 (E2A)

Emission to (sewer description): Trade Effluent

Volume to be Emitted: See below:

	Current Volume to be Emitted	**Proposed** Volume to be Emitted
Maximum in any one day (m^3)	5.0	5.0
Maximum rate per hour (m^3)	0.5	0.208

	Current Emission Limit Value			**Proposed** Emission Limit Value		
Parameter	Daily Mean Concentration (mg/l)	Daily Mean Loading (Kg/day)	Annual Mean Loading (Kg/Year)	Daily Mean Concentration (mg/l)	Daily Mean Loading (Kg/day)	Annual Mean Loading (Kg/Year)
BOD	800	4	1455	5,000	25	9,075
COD	15,000	75	27,225	30,000	150	54,450
Suspended solids	500	2.5	582	500	2.5	632
pH	6 to 9	6 to 9	6 to 9	6 to 9	6 to 9	6 to 9
Temperature	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient
Additional Parameters						
Total Nitrogen (as N)	50	0.25	91	150	0.75	272
Ammonia	10	0.05	18	15	0.075	27
Toxicity Testing	------	------	------	10 Tox Units	10 Tox Units	10 Tox Units
Analysis for Dangerous Substances	------	------	------	As per S.I. 12 2001	As per S.I. 12 2001	As per S.I. 12 2001
Fats, Oils, Greases	------	------	------	50 mg/l	TBD	TBD
Grease Interceptor & Maintenance	------	------	------	Install		

TBD : To be determined (No data available)

NOTE: The annual loading has factored in discharging for 24 hours a day within flow limits taking into account the contributions of different waste streams which have different properties i.e. Suspended Solids. The historical numbers of days worked has also been taken into account i.e. 363 days x (24hrs Production day over a day 7 day week) in one area, and 233 days x (8 hrs Production day over a 5 day week) in another. Additional contributions which are included in total flows are:

Volume of Backwash Water: 300L once a day x 4 times a week
Volume of Boiler blowdown is 10L once a day x 5 times a week

Frequency of Monitoring Process Effluent to Sewer

Emission Point Reference no : S1 (E2A)

Parameter	Monitoring Frequency (monthly, quarterly, annually)	Sample Type
Flow to sewer	Continuous	Composite
Temperature	Ambient	Ambient
pH	Continuous	Composite
BOD	Quarterly	Composite
COD	Weekly	Composite
Suspended Solids	Weekly	Composite
Additional Parameters		
Total Nitrogen (as N)	Quarterly	Composite
Ammonia	Quarterly	Composite
Toxicity Testing	Annually	Composite
Analysis for Dangerous Substances	Annually	Composite
Fats, Oils, Greases	6 Monthly	Composite

Appendix. I.3.2

Letter confirming connection to Sewer

RECEIVED 5-JULY-05

Comhairle Chontae Chorcaí
Cork County Council

Glashaboy Waterworks,
Richmond,
Glanmire,
Co. Cork.

Tel. No: (021) 4821433 / 4821581
Fax No: (021) 4821813

Web: http://www.corkcoco.com/

Mr. Gerry Clancy,
Technical Manager,
Punch Industries Ltd.,
Wallingstown,
Little Island,
Co. Cork.

4th July 2005.

RE: Punch Industries Ltd. Effluent Disposal.

Dear Sir,

I refer to your letter dated 23rd June 2005 concerning the above.

The main sewers in this area are connected to the Carrigrennan Sewage Treatment Plant.

If Punch Industries Ltd. is connected to these sewers then the effluent will be carried to Carrigrennan Sewage Treatment Plant.

Yours faithfully,

David O'Keeffe.

DAVID O'KEEFFE
SENIOR EXECUTIVE ENGINEER

NOTE
29-JULY-05. DURING A DRAIN SURVEY OF FOUL MANHOLES COUNTRY WIDE DRAINI CONFIRMED THAT FL CONNECTED TO THE MAIN LINE OUTIDE T THE SITE BOUNDARY.

Appendix I.3.3

Respirometry Testing of Trade Effluent

Glasnevin, Dublin 9. Ireland
Glas Naíon, Baile Átha Cliath 9. Eire
t: +353.1.808 2000 / 857 0000 f: +353.1.808 2020

ENTERPRISE IRELAND

Environment Programme.
Laboratory Services.

Sheet no. 1 of 13 sheets.

CONFIDENTIAL REPORT

Client:

Punch Industries Ltd
Wallington
Little Island
Co Cork

Title:

Respirometry testing
of trade effluent.
(IPC Licence Reg. No. 127)

Attn: **Mr Gerry Clancy.**

Job No. **N260 ISO**

Report by: **Joe McNamee**

Job Ref: **63/142097**

Approved by: **Martin Reilly**

Order No.: **0008457**

Copies to:

Date: **4th August 2005.**

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4. *Payment for work carried out shall be in accordance with the terms and conditions stated on Enterprise Ireland's invoices.*
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6. *Enterprise Ireland will not release any information received from or provided to the client in relation to this report except as may be required by law or as specified by the client.*
7. *The laws of Ireland, including the Freedom of Information Act, 1997, shall apply.*

Introduction

Enterprise Ireland was requested by Punch Industries Ltd (formerly Glanmire Industries Limited) to carry out respirometry testing on a sample of trade effluent arising from their manufacturing operation in Wallingstown, Little Island, Co Cork. The work was required in connection with a review of the company's Integrated Pollution Control licence (Register No. 127) issued by the Environmental Protection Agency to discharge trade effluent to the Local Authority foul sewer. The sewer is connected to the municipal waste water treatment plant in Carrigrenan (Little Island) which provides full biological treatment in admixture with domestic sewage.

The company were requested by the Local Authority to have respirometry testing carried out to:

(a) determine the acute toxicological impact, if any, of the discharge on the Carrigrenan WWTP and
(b) provide a general assessment of the biodegradability of the effluent.

Enterprise Ireland was contracted by the company to carry out this testing.

The toxicity test was carried out using an International Organization for Standardization test method (ISO 8192). This ISO test specifies a method for assessing the inhibitory effect of a test material or wastewater on the oxygen consumption (respiration rate) of activated sludge micro-organisms. It provides information on inhibitory or stimulatory effects after short term exposure (up to 180 minutes) of the test sample on activated sludge. The test provides for two methods which can be used, method A and method B. Method A is intended to represent conditions in surface waters while Method B is intended to represent the conditions in a biological wastewater treatment plant. Test method B was carried out on the Punch Industries Ltd sample using activated sludge from Carrigrenan municipal wastewater treatment plant. In addition the sample was tested using non acclimated activated sludge from Osberstown (Naas, Co Kildare) municipal wastewater treatment plant. This plant is regularly used for respirometry testing purposes and is known to be working well and producing a fully nitrified good quality final effluent.

The test for biodegradation was carried using the same two sludge sources by comparing the respiration response of the test sample to that of a known biodegradable substance (OECD synthetic sewage[1]).

Enterprise Ireland collected a composite sample of trade effluent from Punch Industries Ltd on the 7th of June 2005. This sample was returned to the Environment Laboratory in Enterprise Ireland on the same day and given a laboratory reference number W2668. Activated sludge from Carrigrenan and Osberstown WWTP was collected on the 7th and 8th of June respectively. The activated sludge was analysed for suspended solids and conditioned by aerating at 20 °C overnight for use the following day.

The company carry out two main activities on site. These are the manufacture of "shoe care" and "colour catcher" products. Each activity can be carried out independently and gives rise to separate and distinct effluent streams. While "shoe care" and "colour catcher" production is carried out on a regular basis a modified "colour catcher" type production is carried out for approximately 6 shifts every 2 months. After on site physical/chemical treatment both streams combine to produce one trade effluent stream for discharge to the sewer.

The composite sample of trade effluent collected by Enterprise Ireland on the 7th of June represented the production period 11.00h on the 6th until 11.00h on the 7th of June 2005. During this period "shoe care", "colour catcher" and the modified "colour catcher" type product were being produced so the trade effluent generated would be considered by the company to represent a "*worst case*" situation in relation to trade effluent discharge quality.

Toxicity Test (ISO 8192)

Test Principle

Activated sludge in the presence of a suitable easily biodegradable substrate will consume oxygen rapidly at a rate depending on, among other factors, the concentration of micro-organisms present. The addition of a toxic concentration of a test material can result in a decrease in the oxygen consumption rate. The oxygen consumption rate (respiration rate) is measured using a volumetric respirometer to continually measure and record the oxygen uptake. The percent inhibition of the oxygen consumption after a stipulated time (180 minutes) is calculated by comparison with a control sample (OECD synthetic sewage)[1] containing no test material.

The **sensitivity** of the activated sludge can be checked using a reference substance, 3,5-dichlorophenol, which has a known EC_{50} toxicity value in the range of **5 to 30 mg/l** when tested against municipal activated sludge treating domestic sewage. When the same sludge source is regularly used its sensitivity only needs to be checked intermittently and when a different source is used its sensitivity should be checked for each series of tests where possible.

(1) OECD synthetic sewage Standard synthetic sewage as defined by the Organisation for Economic Co-Operation and Development made up at 100 fold strength. Its composition is:

Peptone	*16g*
Meat extract	*11 g*
Urea	*3 g*
Sodium chloride	*0.7 g*
Calcium chloride dihydrate	*0.4 g*
Magnesium sulphate heptahydrate	*0.2 g*
Dipotassium hydrogen phosphate	*2.8 g*
Water	*to 1000 ml*

Test Method

The test was carried out in accordance with Method B of ISO 8192. The only deviation from the test method involved the use of an automatic volumetric respirometer to continually measure and record the oxygen consumption rate instead of a dissolved oxygen meter.

Test Conditions

Test Sample:	Punch Industries Ltd, Trade effluent composite sample, 11.00h on the 6th until 11.00h on the 7th of June 2005.
pH of test sample:	8.9 (the pH was adjusted to approx 7.3 using dilute sulphuric acid before testing)
Activated Sludge Source:	Carrigrenan (Little Island) collected the 7th of June 2005. Osberstown (Naas) collected on the 8th June 2005.
pH of Activated Sludge: Carrigrenan: Osberstown:	 7.3 7.5
Pre-treatment of sludge:	None
Activated Sludge Concentration: (in test chamber):	1500 mg/l
Test Duration:	180 minutes
Test Date:	8th and 9th of June 2005
Test Temperature:	20 °C

Test Results

Carrigrenan Activated Sludge

Sludge Sensitivity Reference Test *(Carrigrenan activated sludge of the 27th April 2005)*

Reference Substance Used: 3,5-dichlorophenol.

Date tested: 28th April 2005.

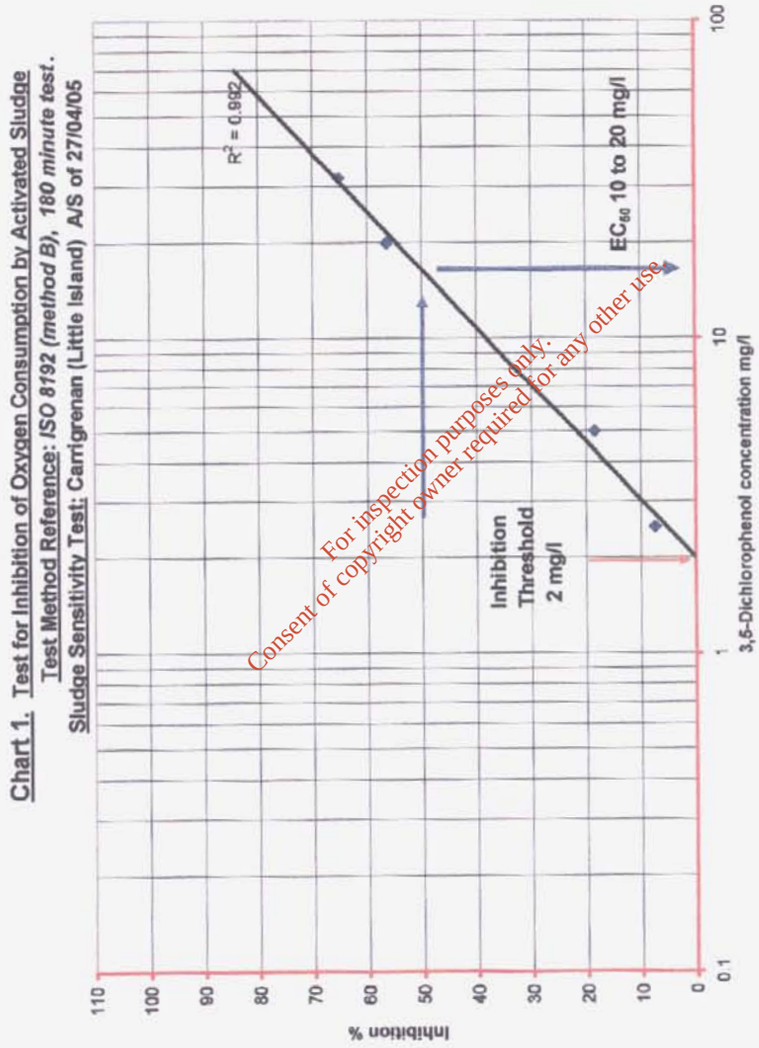
Result of Sludge Sensitivity Test:

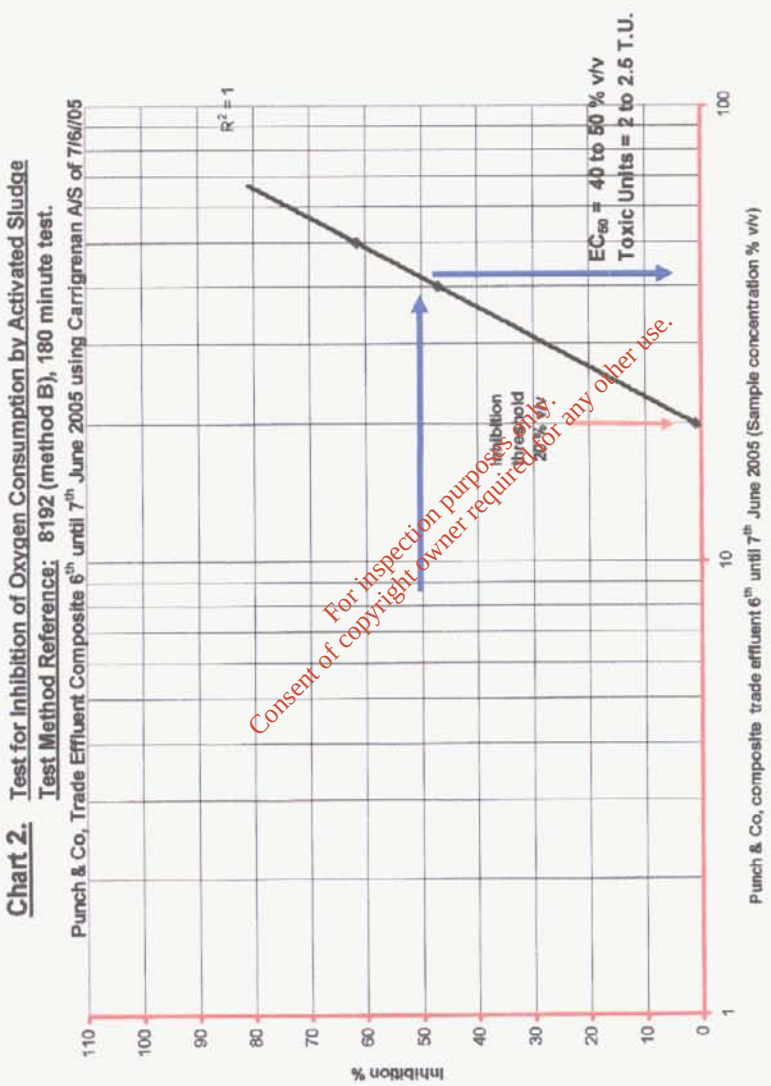
180 min EC_{50} toxicity value: 10 to 20 mg/l (see inhibition Chart No. 1) **As this value was within the normal range (5 to 30 mg/l) for municipal activated sludge the sludge was suitable for testing purposes**

Result of Sample Test using Carrigrenan Activated Sludge (ISO8192): (see inhibition Chart No. 2)

	Toxicity Value, 180 min EC_{50}	Toxic Unit, 180 min TU	Inhibition Threshold
Punch Industries Ltd, Trade effluent composite sample, 11.00h on the 6th until 11.00h on the 7th of June 2005	**40 to 50 % v/v**	**2 to 2.5 TU**	**20 % v/v**

Definitions
EC_{50} The effective concentration (0 to 100 % v/v or mg/l) of the test sample giving a calculated or interpolated inhibition of oxygen consumption of 50 % as compared to a blank control.
Toxic Unit. An alternative means of expressing effluent toxicity (0 to 100 % v/v only) as a function of the undiluted sample. This is known as the Toxic Unit and is defined as 100/ EC50.
Inhibition Threshold. The effective concentration (0 to 100 % v/v or mg/l) of the test sample giving a calculated or interpolated inhibition of oxygen consumption of zero as compared to a blank control.





Osberstown Activated Sludge.

Sludge Sensitivity Reference Test *(Osberstown Activated Sludge of the 1st June 2005)*

Reference Substance Used: 3,5-dichlorophenol.

Date tested: 1st June 2005.

Result of Sludge Sensitivity Test:

180 min EC_{50} toxicity value: 10 to 20 mg/l (see inhibition Chart No. 3)

As this value was within the normal range (5 to 30 mg/l) for municipal activated sludge the sludge was suitable for testing purposes

Result of Sample Test using Osberstown Activated Sludge (ISO8192): (see Inhibition Chart No. 4)

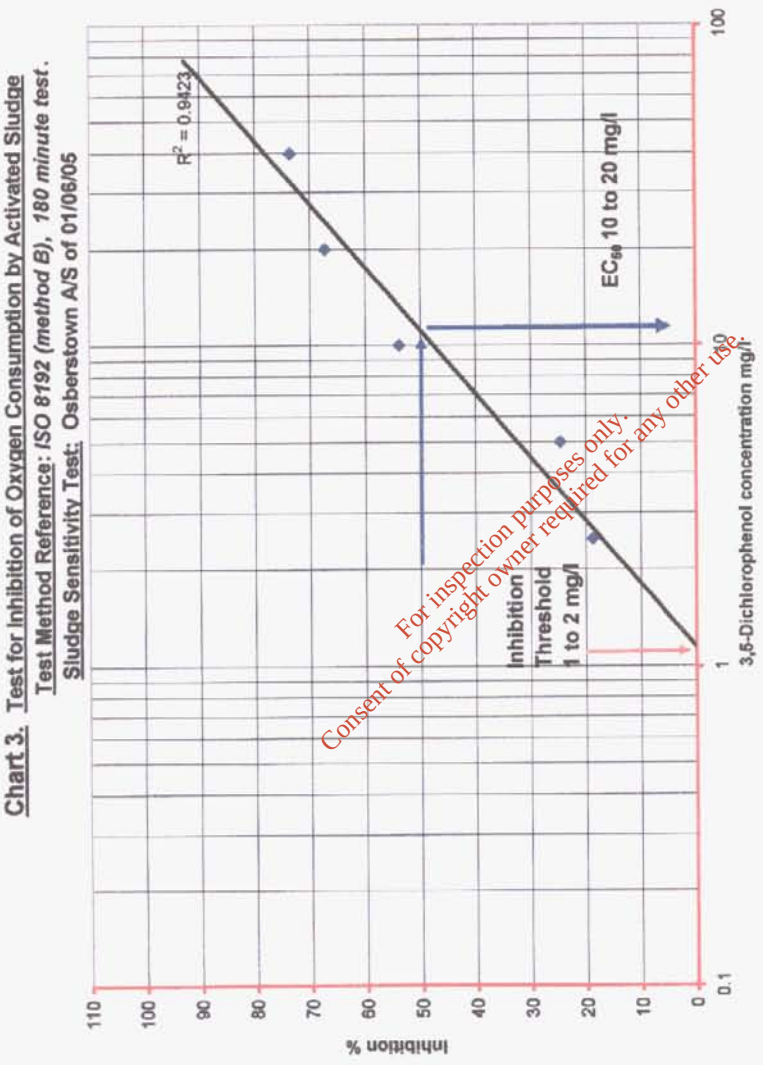
	Toxicity Value, 180 min EC_{50}	Toxic Unit, 180 min TU	Inhibition Threshold
Punch Industries Ltd, Trade effluent composite sample, 11.00h on the 6th until 11.00h on the 7th of June 2005.	20 to 30 % v/v	3.3 to 5 TU	10 % v/v

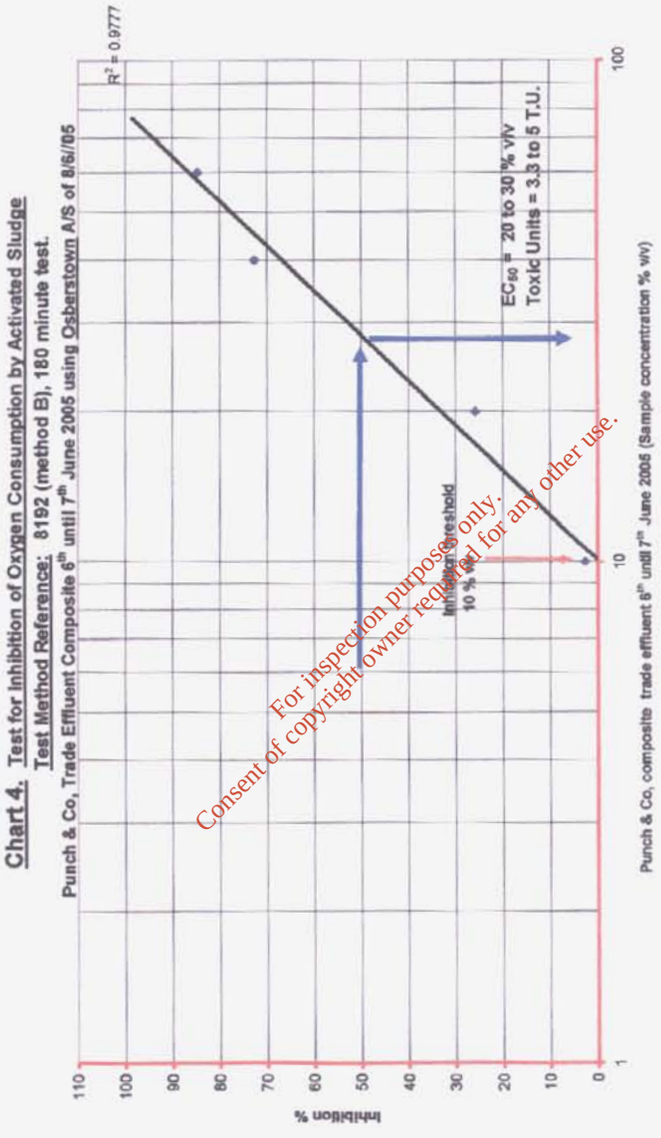
Discussion

The trade effluent was tested for acute toxicity using acclimated (Carrigrenan) and non acclimated (Osberstown) activated sludge. The results indicated an EC_{50} value (180 min) of 40 to 50 % v/v and an Inhibition Threshold of 20 % v/v for Carrigrenan A/S. The non acclimated Osberstown A/S showed an EC_{50} value of 20 to 30 % v/v and an Inhibition Threshold of 10 % v/v.

Punch Industries Ltd are currently licensed to discharge up to 5 m^3 of trade effluent per day to the local authority sewer. They are seeking an increase in this volume limit to 7.5 m^3 per day. The estimated Dry Weather Flow in the sewer is 85,000 m^3 per day (source; Cork City Council). This is made up of approximately 50 % **domestic** and 50 % industrial effluent. Based on the company discharging at up to 7.5 m^3/day the maximum daily hydraulic load to the sewer from Punch Industries Ltd would represent about 0.02 % of the **domestic** dry weather flow to the Carrigrenan WWTP.

Based on the results obtained using Carrigrenan activated sludge the Inhibition Threshold found (20 % v/v) is 1000 times higher than the maximum concentration of Punch Industries trade effluent in the sewer (0.02 % of the **domestic** dry weather flow) at a discharge rate of 7.5 m^3/d.





Biodegradation

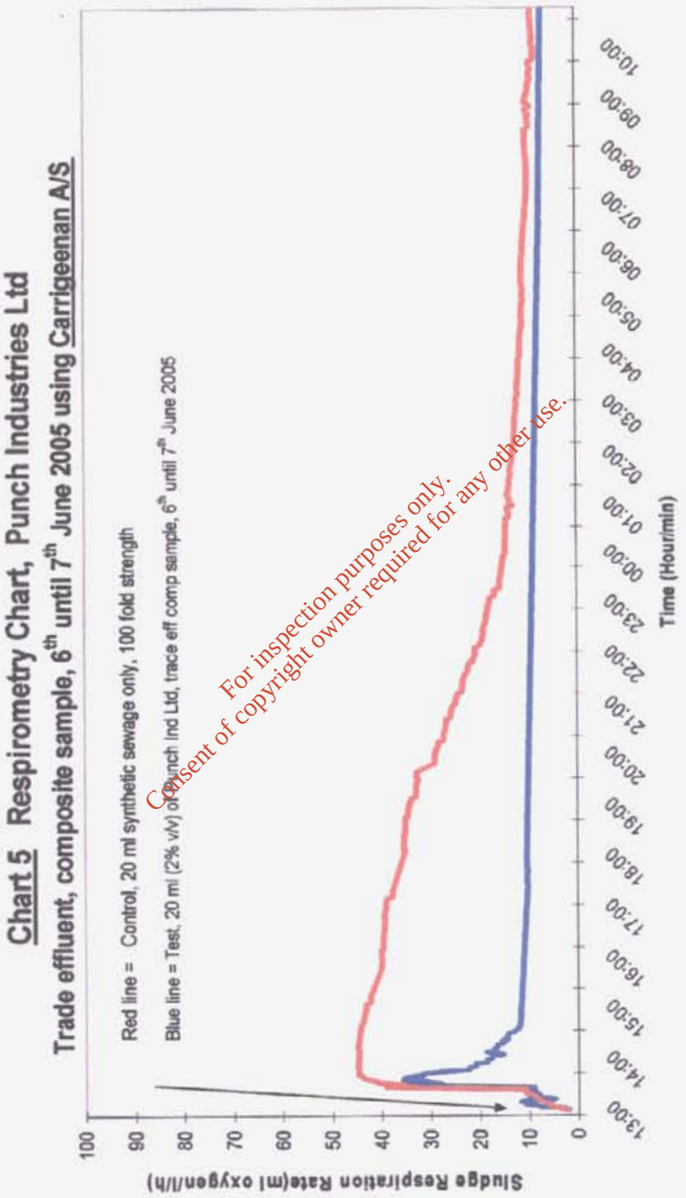
Biodegradation can be defined as "the ability of a compound to undergo microbial attack" or "the breakdown of a compound by micro-organisms". Respirometry provides a general indication of the biodegradability of a wastewater or trade effluent by activated sludge in a biological waste water treatment. It can best be used by comparing an "unknown" sample against a known biodegradable sample.

Test Procedure

Testing was carried out on the 9th of June. A suitable quantity of activated sludge (A/S), collected from the aeration basin in Carrigrenan and Osberstown treatment plants respectively was placed in each of four respirometer units to give an operating suspended solids concentration of 3,000 mg/l. Unit No 1 was used as a control and Unit No 2 as a test using Carrigrenan A/S and Unit No 3 and 4 were used in a similar manner but with Osberstown A/C. The controls (Unit No 1 and 3) received 20 ml of **OECD 100 fold strength synthetic sewage** and the tests (Unit No 2 and 4) received 20 ml of the trade effluent sample to give a final volume of 1 litre. The respiration rate was recorded overnight and presented in Charts 5 and 6 below.

Test Results

The respirometry Charts 5 and 6 indicate that the respiration response of the Punch Industries effluent is quite similar using either the Carrigrenan or Osberstown A/S. The control showed a large sustained increase in the respiration rate followed by a gradual decrease overnight as the substrate was biodegraded. The test sample showed a smaller sharp increase followed by an initial rapid decrease and a further very gradual decrease overnight. The increase in the respiration rate of the test sample is a definitive indication of biodegradation. The difference in the height and duration of the control as compared to the test sample can be explained by considering the relative organic strengths of the samples. The organic strength of the synthetic sewage was much stronger than the test sample and hence it would be expected that the respiration rate would continue for much longer. The BOD and COD of the synthetic sewage was approximately 20,000 and 35,000 mg/l respectively while the BOD and COD of the test sample was 2,400 and 13,000 mg/l respectively (results supplied by the company).



12

Appendix. I.3.4

Toxicological Testing of Punch Industries Trade Effluent using *Scopthalmus maximus*

Shannon Town Centre, Shannon, Co.Clare, Ireland
Croí Bhaile na Sionna, Sionainn, Co an Chláir, Éire

t:+353. 61. 718 300 f:+353. 61. 361 979

ENTERPRISE IRELAND

CONFIDENTIAL REPORT
SHANNON AQUATIC TOXICITY LABORATORY

Dept. Toxicity
Sheet no. 1 of 2 sheets

Tox F020 Ver. 2.0

Client
Punch Industries
Little Island
Co Cork

Title
Toxicological analysis of an effluent sample

Attn: Mr. Gerry Clancy

Report ref.:	05T086	Order no.:	008458
File no.:	R.6.00383B	Report by:	James O'Neill
Date recd.:	13.06.05	Approved by: Jim Clancy Head of Department	
Copies to:	R.6. Files	Date:	24/06/05

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Test report relates only to the sample(s) tested

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ENTERPRISE IRELAND

TOXICOLOGICAL TESTING REPORT Form No.: ToxF035 Ver 1.8

SAMPLE DESCRIPTION

Client:	Punch Industries
Client Sample Description:	Combined effluent, sampled 11-12.06.05
Tox. Ref. No.:	05T086
Date of Receipt:	13.06.05 Storage Conditions: 3°C ± 3°C

SAMPLE INFORMATION
(supporting data not within scope of INAB accreditation)

	SATL	Client	Other
Sampled by:	☐	✓	☐
Collected by:	✓	☐	☐

Sampling Procedure: n/a

Temperature: (°C)	18.2	pH: (at 18.2°C)	8.9
Dissolved Oxygen: (mg/l)	0.9	Dissolved Oxygen (% saturation)	9.8
Conductivity: (mS/cm at 25°C)	71	Salinity ‰: (at 20°C)	48.2

TEST PROCEDURE

Test Species: *Scophthalmus maximus* Test Date: 13.06.05

Test Procedure: Method 6.7 based on OECD 1992; Guideline 203; - 'Fish, acute Toxicity test'

TEST RESULT

Test Parameter	Test Result	No. of Toxic Units	95% Conf. Limits
96 h LC_{50}	4.2% vol./vol.	24	n/a

Method of Calculation: Binomial

Comments:

100% mortality occurred at 5.6% vol./vol.
No mortality occurred at 3.2% vol./vol.

Attachment I.8
Environmental Considerations and BAT

Punch Industries
Revised IPC Licence Application

CONTENTS

1. ENVIRONMENTAL CONSIDERATIONS

Introduction

Punch Industries is committed to conducting activities such that they have a minimal impact on the environment. The facility strives to reduce negative environmental impacts by continually developing and modifying all procedures.

Environmental considerations have been made in the following areas:

- Process Modifications,
- Process Control,
- Process Management,
- Cleaning Procedures,
- Recover, Reuse & recycle,
- Fugitive Emissions,

Details of process improvements and modifications are all considered Best Available Techniques (BAT) in the context of the management of the facility in respect of emissions to the environment and in consideration of activities at Punch Industries.

The Punch Industries Policy with regard to new product development is that no carcinogenic materials must be used in any formulation. All packaging that is purchased must be recyclable or recycled. No ozone depleting propellants are used in aerosols. All formulations must be water based if possible. An R&D program is in place to address the use of V.O.C's for aerosols.

2. PROCESS MODIFICATIONS

Processes have been modified as follows:

Waste Minimisation: The original IPC license was issued in October 1996 and since that time the balance of production in Punch Industries has changed greatly. At that time the bulk of production consisted of Shoe Care and household products with the consequent effluent being treatable in house prior to discharge. Over time, pilot trials on a fabric care product called Colour Catcher followed by increasing volumes of production has changed the balance of the effluent produced. The Colour Catcher active ingredient is a highly soluble QAC. On site treatment through the current batch treatment process, using chemical precipitation and bag filtration separation does not seem to be an option.

- A process has been designed that limits the quantity of effluent produced through continuous recycling of treatment solutions with eventual pH neutralisation of the remaining effluent. This has reduced the quantity of Effluent being sent to sewer. However further treatment on site does not seem to be a viable option. The sludge

that remains after chemical precipitation and bag filtration separation is currently sent off site for energy recovery/disposal.

- Substitution of Raw Materials: Colour Catcher is the market leader in this particular niche of Fabric Care products. To sustain this position an active research and development programme is maintained. The next generation product involves work on an active raw material which is not based on the same chemistry. It does not have the same environmental considerations associated such as high COD, Total Nitrogen and pH as with the current Colour Catcher active ingredient. This alternative active ingredient has undergone successful lab trials and has been identified for production trials although some issues remain to be resolved.
- High level and low level pH range alarms has been fitted to the Effluent treatment plant outlet to sewer which automatically shuts down the flow to sewer in the event of a pH out side of the range 6 to 9 being detected. These are also fitted with flashing beacons and audible alarms.
- High level volume alarms are fitted to the Final Holding Tanks.
- A pH probe is fitted in the Neutralising tank located in the Colour Catcher area to detect complete neutralisation of the effluent prior to pumping to the Effluent Treatment Plant. Additionally a second probe is fitted to the outlet from this tank and in the event of a reading outside of an acceptable (6.2 to 8.7) range the effluent is returned to the tank for further neutralisation. This system is also fitted with audio and visual alarms.
- A bucket filter has been fitted to the post bag filtration stage to remove additional quantities of suspended solids from the effluent prior to discharge to sewer.
- Aeration has been introduced to the final Effluent Holding tanks to aid in complete mixing and reduction of COD prior to discharge.

3. PROCESS CONTROL

3.1 Emission Control / Reduction

In an attempt to evaluate and optimise Punch Industries emissions to sewer, strict monitoring of emission point SE1(E2A) ensures that emissions remain within the requirements of the interim agreement with the sanitary authority pending review of the IPC Licence.

3.2 Accidental Release Control/Reduction

A Drain survey was conducted in August 2005 to ensure the integrity of all underground piping for the transfer off effluent to the foul sewer. Subsequent Foul Sewer relining was completed in December 2005. Replacement of the over ground effluent piping took place in November 2005.

3.3 Waste Control/Minimisation

It is proposed to track all individual effluent discharges by flowmeter to provide greater traceability on effluent generation on site. Total flow to the foul sewer is currently tracked.

3.4 Energy Control / Reduction

Energy demand at Punch Industries is by natural gas and electricity. Steam demand for process purposes is made by a natural gas fuelled Steam Boiler. Energy consumption increased from 2003 to 2004 (38%) because of new shift arrangements and the introduction of a blow moulding facility. Energy consumption fell by 9.8% during 2004 compared to 2005 due to stabilisation in the requirements for shift arrangements and a heighten awareness of energy efficiency.

Punch Industries are planning to implement a detailed resource monitoring programme, which will involve quantifying, and evaluating key energy usage points and evaluating and implementing reduction programmes as part of the Environmental Management programme for 2006.

3.5 Environmental Risk Control

The control of all Environmental, Health and Safety issues arising from the introduction of new materials and equipment and processes on site are reviewed in advance. This control is necessary to ensure the efficient management of all EHS issues, compliance with legal requirements and also to ensure that the EPA can be informed of any modifiable changes as required under the terms of the IPC Licence.

4. PROCESS MANGEMENT

4.1 Environmental Risk Control / Reduction

A regular review of the methodology behind the storage procedures of materials is carried out. This ensures a proper system of storage is implemented. The methodology for the storage of materials (separation and segregation) is described in QP1.13 Chemical Storage Guidelines.

A tool for the procurement of chemicals, inventory management, manufacturing, release and shipment of finished product has been introduced called PeopleSoft. This new ERP

(Enterprise Resource Planning) system was introduced in October 2005. This indirectly benefits environmental management through improved chemical stock control.

It is intended to introduce a new Environmental Health and Safety software package in 2006 called MAI Health, Safety & Environmental suite. This should simplify and facilitate the generation of waste stream information; the AER required by the EPA and also facilitate Risk Assessment and the progression of on going programmes and projects.

4.2 Accidental Release Control / Reduction

Spill Kits have been installed at specific locations throughout the site. Operators responsible for transport and loading activities have received Chemical Awareness Training to ensure that proper storage, segregation and separation practices are used.
Punch Industries utilises the services of Shannon Environmental Services Ltd and Trident Group Ltd in providing a Dangerous Goods Safety Advisor when necessary.

4.3 Improved Environmental Performance

All Environmental Equipment requiring calibration is covering by the Control of Inspection, Measuring and Test QEM 18 and tracked electronically using the Q Pulse Software system.

4.4 Improved Environmental Incident Response

All manholes are readily identified and secured while in use and are easy to use when required. Fire fighting equipment is serviced regularly, quarterly Fire Extinguisher Training is held and Fire Drills take place regularly on site.

5. CLEANING PROCEDURES

5.1 Emission Reduction

Training emphasises cleaning procedures that minimise the amount of cleaning materials and water used. Spillages are dealt with in accordance with QP1.5 Spill Procedure.

5.2 Recover/ Reuse / Recycling (on site)

Wherever possible washouts from process vessels are reused; to the make up new batches to minimise the quantity of liquid waste going to the effluent treatment plant.
Suitable IBC's are cleaned, filled with product and shipped to subcontractors to be filled off or for sludge storage prior to disposal.

5.3 Recover/ Reuse / Recycling (off site)

Timber products and cardboard are collected and recycled by an external waste contractor thereby reducing cost. Furthermore a system of collection toner and printer cartridges is in operation at the site.
Punch Industries participates in a Waste Timber recycling scheme operated by an external contractor. The company collects on a weekly basis, all wood waste from the site. The material once collected from Punch Industries is segregated, and then is either A/ Reworked into pallets, B/ Dismantled and shredded into derivatives to either the paperboard industry or Scrap Metal Merchants.

Punch Industries participates in the Norman Lauder Ltd SCHULZ IBC's recycling programme. All of the IBC's are either returned for recycling, or reutilised for the storage of product or for sludge storage prior to disposal.

6. FUGITIVE EMISSIONS

Punch Industries strives to obtain continuous improvement in emissions of fugitive emissions to the atmosphere through:

- Programmes to reduce over time the use of solvent in formulations with the main emphasis on the use of water based formulations,
- Volatile solvents are the last component to be added to vessels where possible. Fugitive emissions are reduced by this step as solvents which could be responsible for fugitive emissions are exposed to the air for less time.
- Fugitive emissions from melting wax may occur from time to time. These are controlled by ensuring the use of secure fitting lids on the melting vessels.
- Breathing losses may occur from filling tanks and the aerosol filling operation. However these are minimized by PM routines and good housekeeping practices

7. WASTE STORAGE / ABATEMENT

Waste Sludge covered and stored in a secure area while awaiting disposal.

All waste stored is clearly labelled and marked.

Waste Chemicals are stored in fabricated containment bunds pending recovery / disposal.

A procedure for collection, storage and disposal of waste oils and scrap metal is employed on site. Waste Oil control procedures have been put in place and a dedicated waste oil storage tank has been created. Scrap metal is removed by an external waste contractor for recycling.

8. ENVIRONMENTAL TRAINING

A PowePoint Based Training Package has been prepared describing the Punch Industries IPC Licence and Environmental Considerations. The intention is to include this training as part of the Induction Programme for all new employees and employees whose role has changed.

Appendix I.8.1

Viability of Different Treatment Techniques for Punch Industries Effluent

Survey of effluent streams resulting from production processes carried out by Glanmire industries Little Island investigating the effectiveness and viability of treatment techniques to consistently achieve licensed discharge parameters as stated In IPC license No.127.

Compiled & reported by Envirotech 04/07/03

1

Introduction

Glanmire Industries are required to achieve effluent discharge parameters as stated in IPC licence No.127. A summary of the licensed parameters are listed below.

Licensed parameter	Discharge limit
COD	15000 mg/l
BOD	800 mg/l
Total Nitrogen	50 mg/l
Suspended Solids	500 mg/l
Ammonia	10 mg/l
pH	6-9
Flow	5 cubic meters per day

It must be noted that the License was issued to Glamire Industries years prior to their development of the Colour Catcher process. The licensed parameters as stated in IPC licence no.127 were issued with respect to the effluent stream generated from the shoe care products manufactured on-site. Historically Glanmire Industries have been generally compliant with these parameters and have installed a batch treatment process using a chemical precipitation technique and bag filtration physical separation method to good effect.

Glanmire Industries have experienced difficulties in complying with certain discharge parameters listed above particularly COD, BOD and Total Nitrogen since the introduction of the Colour Catcher production process to the site. This process is responsible for approximately $3m^3$ of the aqueous effluent generated daily with the shoe care production process responsible for approximately 1.5 m^3 of the effluent. The aqueous effluent resulting from the colour catcher process is now the major constituent (approx 66%)of the total aqueous effluent generated on-site.

An epoxy ammonium chloride solution is the active ingredient involved in the colour catcher process. Due to matters of product confidentiality no further detail of this solution can be given here.

Envirotech were commissioned by Glanmire Industries Ltd. to carry out a treatability study on the effluent streams arising from their Colour Catcher production process and their shoe care products.

The aim of the study was two-fold;

1. To provide accurate laboratory results to determine the loadings of the two effluent streams in particular for the parameters of COD and total nitrogen.
2. With the above information a series of both chemical treatment techniques were investigated on a laboratory bench scale with the view of scaling up the most suitable technique so as Glanmire Industries can proceed to treat the effluent on site and achieve the current licensed discharged parameters.

The concentration of Chlorides in the Colour Catcher effluent stream were also given special attention due to interferences arising in the analytical test methods from high

chloride concentrations. Analytical techniques were also investigated as to their suitability.

Analytical Results

A composite sampler was set up on site to take daily samples of both the effluent streams. Colour catcher effluent samples were collected from the effluent neutralisation tank over a four day period from Tuesday 15/04/03 to Friday 18/04/03. Composite samples of the Shoe care effluent were taken from the collection sump over a five day period on the following dates 22/04/03 to 29/04/03.

Colour Catcher Effluent (Neutralised)			
Date	COD mg/l	Total Nitrogen * mg/l	Chloride mg/l
15/04/03	33550	19.5	36988
16/04/03	24825	16.5	36488
17/04/03	19287	14.3	39087
18/04/03	23075	16.0	60481

* Total Nitrogen is defined as the sum of Total oxidised nitrogen and total kjeldahl nitrogen (See appendix 2)

The COD results for the Colour catcher were achieved by diluting the samples by 1/100 to remove the interference potential of the chloride from the test.

Earlier work carried out by Envirotech had drawn conclusions that to achieve accurate Total Nitrogen results it would be necessary to precipitate the excess chloride with silver nitrate. Chloride concentrations above 1000 mg/l are known to result in positive interferences.

This method was also investigated for the preparation of a sample for COD analysis by removing the potential chloride interference. COD results were measured at approximately 350 mg/l.

These results appeared promising however it was questionable as to whether the precipitation with silver nitrate was removing COD bound to the chloride.
Samples of the effluent were treated with powdered activated carbon, both COD and Chloride levels were monitored before and after treatment. Up to a 20% reduction was obtained in COD reduction however a significant drop in chloride concentration was also noted. This would seem to indicate that a significant amount of the chloride is bound to COD and thus precipitation of the chloride with silver nitrate is not a suitable sample preparation step for COD analysis.

Untreated Shoe care effluent		
Date	**COD mg/l**	**Total Nitrogen mg/l**
22/04/03	9450	160
23/04/03	18100	58
24/04/03	9275	40
25/04/03	6462.5	35
29/04/03	15212.5	85

The following treatment techniques were considered:

pH Neutralisation
Chemical precipitation /Sedimentation and Filtration
Adsorption
Oxidation
Ultra-violet Irradiation

Previous work carried out solely on the colour catcher aqueous effluent had show that both pH neutralisation and chemical precipitation were ineffective treatment techniques for the reduction of COD. (see appendix 1).

The chemical precipitation technique was again investigated using a combination of both the effluent streams to evaluate absorption of the Colour catcher COD by the sludge resulting from the chemical precipitation of the Shoe care effluent.

Chemical Precipitation

Samples of the neutralised Colour catcher and untreated shoe care effluent were mixed together in a 2:1 ratio to make a true representation of the daily effluent volumes.

The following range of Coagulants were used to form a precipitate within the combined solution;

Ferric Sulphate
Ferrous Chloride
Aluminium Sulphate
Aluminium Chloride
Calcium Chloride
Alumina Silicate clay

The Iron and Calcium salt solution proved ineffective at precipitating the colloidal materials. The Aluminium species proved more effective with Aluminium sulphate being the most suitable. A suitable cationic polyelectrolyte was also identified and evaluated to provide the necessary flocculation of the coagulated colloidal particles to allow for filtration of the supernatant.

The supernatant was analysed for COD. The samples of supernatant analysed for COD varied between 14575 mg/l and 16500 mg/l. Evidently this process cannot be guaranteed to produce a treated effluent that will meet the current licensed COD discharge parameters.

It was also noted that in the precipitation and flocculation of the combined effluent that the required dose rate of Aluminium sulphate increased four fold and that of the polyelectrolyte increased 10 fold over the volumes used on shoe care effluent alone.

This will have significant cost implications for Glanmire Industries.

Filtration

The active ingredient used in the colour catcher process has a high affinity for adsorption onto the particular paper material used in the production process. It is known that the active ingredient breaks down into intermediates during the process.

Samples of the paper material used in the production process were evaluated as possible filtration media to adsorb the COD from the effluent generated from the process.

Aliquots of the colour catcher effluent were filtered by gravity and under vacuum, a recycle loop was also evaluated. There was only an incidental difference in measured COD values using this process.

This indicates that the intermediate compounds formed are either extremely soluble or miscible.

Adsorption

Samples of both granulated and powdered activated carbon were evaluated as to their adsorption capacity for the intermediates present in the effluent. Provided the COD comprises of C4 species and above and is not miscible in aqueous solutions Activated Carbon can be very effective at adsorbing these species thus reducing the COD present in the aqueous media.

Specified dose rates of 1000mg/l and 5000mg/l of various carbons were added to an agitated sample of colour catcher effluent and left overnight to allow adequate contact time. 1000mg/l equates to $1kg/m^3$.

The samples were filtered and analysed for COD. Poor COD reduction was achieved as outlined in a typical sample analysed below

Sample	COD mg/l
untreated	33550
Dose rate1000mg/l BP2WL	31650
Dose rate 5000 mg/l BP2WL	28275

These results further prove that the intermediate compounds formed appear extremely miscible, thus activated carbon will not prove to be an effective treatment technique.

Previous laboratory work (see appendix 1) on the colour catcher effluent had indicated that using a series of adsorption steps i.e. Activated Carbon, Zeolite and Ion Exchange that good reduction in COD and Total N was possible. As a result a small pilot of 4 adsorption cartridges in series were evaluated for performance on site. The results from this trial proved inconclusive and the method was disregarded.

Oxidation

Oxidation is a widely used method to treat polluting components of liquid wastes. Most oxidising agents are non selective therefore oxidation is best suited to wastes of low organic content. Because oxidising agents are non selective they will react with many compounds thus using excessive amounts of the oxidising agents.

30% Hydrogen Peroxide and 12-14% Sodium Hypochlorite solutions were evaluated as possible oxidising agents. Neither proved very successful for COD reduction.

Oxidising agent	COD mg/l Before treatment	COD mg/l After treatment
30% H_2O_2	33550	31950
NaOCl	33550	30950

Dose rates of 0.3ml oxidising agent per 100ml sample of effluent delivered the above results. Higher additions of the oxidising agents did not result in improved COD reduction.

Ultra Violet Irradiation

A two litre sample of the colour catcher was recycled through a 15 W domestic lamp over a 16 hour period.

A reduction from 24825 mg/l to 22750 mg/l was achieved.

Hydrogen peroxide and UV

A similar lab set up to that used in UV step above was considered, an addition of 400 ml of hydrogen peroxide to the 2 litre sample and UV treatment resulted in a reduction in COD from 24825mg/l to 11650mg/l. A brownish precipitate was formed during this treatment.

Although the COD reduction was impressive this method has not been previously been scaled or proven on a plant scale. The feasibility of such a technique becomes questionable when considering its cost effectiveness. A linear extrapolation of hydrogen peroxide consumption to daily effluent volumes alone will result in a consumption of approximately 600 litres of hydrogen peroxide daily. This equates to a cost of approximately €250 per day.

Advanced Oxidation

One other possible method for treatment is the use of ozone in conjunction with UV. This treatment method is proposed as being much more cost effective than that listed above, this method again requires investigation and scale up. Envirotech hope in the near future to be in possession of a lab scale pilot plant to investigate the potential of this method but presently are not in a position to do so.

Biological Treatment (See appendix 1.)

The Colour catcher effluent has an inherent BOD figure associated with it, previous work undertaken through respirometery tests on the effluent has shown that the effluentt is non toxic to the micro-organisms found in an activated sludge plant.

Conclusions

A comprehensive study of possible treatment techniques for the effluent produced by the colour catcher process have been evaluated on a lab bench scale.

Although certain methods resulted in positive results with regard to the treatment of the effluent to and below discharge parameters as set out in IPC licence no.127, the feasibility due to cost effectiveness or proven technologies is questionable.

The pre-treatment of the effluent with silver nitrate to remove chloride interference for COD analysis is not a suitable step as there are strong indications that the precipitation reaction also removes COD thus resulting in an unrepresentative analysis.

As stated earlier it must be noted that the current IPC License was issued to Glanmire Industries on the 16/10/96; years prior to their development of the Colour Catcher process. The licensed parameters as stated in IPC licence no.127 were issued with respect to the effluent stream generated from the shoe care products manufactured on-site.

As the Colour Catcher process is a completely new production process carried out on site, it represents a substantial change in production methods. The effluent resulting from the production process is having a significant adverse affect on the ability of Glanmire Industries to comply with the discharge parameters as set out in IPC licence no.127.

Envirotech would advise Glanmire Industries to investigate the possibility of a license review with the EPA on the grounds stated above.

APPENDIX 1

Treatability Study on Colour Catcher Effluent for Glanmire Industries Ltd.

19th November 2001

9

Envirotech were commissioned by Glanmire Industries Ltd. to carry out a treatability study on their colour catcher effluent.

The aim of the study was to provide accurate laboratory results on various treatment techniques, so that Glanmire Industries can proceed to treat the effluent on-site in the most suitable manner.

The treatments considered were

pH neutralisation
Chemical Precipitation
Physical Separation
Adsorption
Biological Treatment

10

Analytical Results

There are two distinct liquid wastes to be treated, the acid wash and the alkali rinse.

Two separate sets of samples were taken of these on successive weeks. The analytical results were as follows:

Week beginning 15/10/01 (all mg/l)

	Acid Wash	Alkali Rinse
COD	25,850	30,250
BOD	16,750	19,750
pH	0.99	7.49
NH_3N	17,750	9
Total N	19,100	216

Week beginning 22/10/01 (all mg/l)

	Acid Wash	Alkali Rinse
COD	23,000	26,300
BOD	16,240	6,240
pH	2.01	7.87
NH_3N	12,230	8.7
Total N	15,350	40

The licence limits for the site are

COD 15,000mg/l
Total N 50mg/l

It appears from this that dilution is an immediate option for the alkali rinse, provided the daily flow allowance is not exceeded.

Clearly however, the high levels of Nitrogen in the acid wash will require pre-treatment of this waste prior to discharge.

An account follows of the investigations into the various potential treatments.

pH Neutralisation

The pH of the acid wash is approx. 1.0. Any treatment for discharge will require neutralisation of this at some stage in order to stay within the limit of 6 – 9.

The most suitable chemical for this purpose is Caustic Soda (Sodium Hydroxide) liquor. It was found that each litre of acid wash required approx. 15mls of 30% w/w Caustic Liquor for neutralisation. This would equate to 15 litres/m^3 of waste

PH neutralisation could also be achieved using a filter containing calcified seaweed. The advantage of this is that you do not need pH controllers/pumps/batch neutralisation tanks. The disadvantage is that the usage would be greater than with Caustic Liquor.

- Estimated cost of treatment per m^3 using Caustic Liquor = £5 - £6.
- Estimated cost of treatment per m^3 using Calcified Seaweed = £15 - £18.
- Budget cost to set up for Caustic neutralisation = £3,500.
- Budget cost to set up for Calcified Seaweed neutralisation = £1,400.

One other point to note is that by raising the pH of the waste as is, a strong ammonia smell was noted. This could be problematic on a large scale (although it could be scrubbed), so neutralisation should take place preferably after ammonia removal.

Chemical Precipitation

The theory behind this type of treatment is in removing unwanted components in an insoluble form by pH manipulation, coagulation and flocculation.

It was found however that the components contained in the acid wash waste were soluble, even with pH variation. This means that coagulants, which can only capture colloidal materials, were ineffective.

Each of the following were tried:

Ferric Sulphate
Ferrous Chloride
Aluminium Sulphate
Aluminium Chloride
Calcium Chloride

None of these were successful in forming a precipitate over a wide pH range.

In addition many organic flocculants were tested with varying molecular weights and charges, but again to no avail.

The reason, as stated above, for this is that the compounds are extremely soluble.

Biological Treatment

Both BOD and Nitrogen can be removed in waste streams by micro-organisms. This is a standard practice in effluent treatment.

The factors affecting it are the amount of each to be removed, the pH, and the suitability of the effluent for such a process, i.e. its toxicity.

The toxicity to activated sludge bacteria of the acid and alkali effluents was tested using two of our standard tests Polytox and Nitrotox.

Polytox is a respirometery test whereby the dissolved oxygen uptake rate (D.O.U.R.) of a group of bacteria is measured as a control. Then the stream to be tested is introduced at various concentrations and again the D.O.U.R. is measured. If the rate slows down by >30% it is said to be inhibitory.

Nitrotox is a test whereby nitrifying bacteria are exposed to various levels of the stream to be tested. The ammonia level is monitored over a four hour period versus a control, and again if the depletion rate slows by >30% it is said to be inhibitory.

The results achieved were as follows:

Polytox

	Acid Wash		**Alkali Rinse**	
	Week 1	Week 2	Week 1	Week 2
% Inhibition	7.5%	3.2%	0%	1.5%

Nitrotox

	Acid Wash		**Alkali Rinse**	
	Week 1	Week 2	Week 1	Week 2
% Inhibition	6.8%	12.1%	2.2%	5%

These results show that overall the effluents are not toxic to these micro-organisms.

It is worth noting that these tests were carried out after pH neutralisation. This would have to be the case if any such treatment as biological plants need to operate in the pH range of approx 6.5 – 8.5.

This may create some difficulties with ammonia volatilising as outlined earlier.

A pilot plant was then set up using a mixture of healthy bacteria taken from operating activated sludge plants.

It was found that over a two-week period, a 75% reduction in BOD was achieved but only a 20% reduction in Nitrogen.

The reasons for this can be explained by activated sludge theory. Standard activated sludge operates on a ratio of BOD:N of 20:1. In this case however we have a waste of BOD:N of approx. 1:1. Nitrification/Denitrification can be set up to deal with higher Nitrogen loads. This was tried but the scale of Nitrogen is simply too high for this to work.

Overall what this means is that while biological treatment can remove the BOD from the waste, further treatment would be necessary for Nitrogen removal, as outlined below.

Budget cost for biological treatment capital installation = £55,000.

Adsorption

The options looked at here are based on the use of materials which will adsorb the compounds causing the high levels of BOD and Nitrogen. These materials are activated carbon, zeolites and ion-exchange resins. Overall the results achieved were excellent.

Acid Wash

	Post Carbon	Post Zeolite	Post Ion Exchange	Post All Three
COD	11,420	16,2[illegible]0	17,220	8,200
Total N	3,800	1,500	75	35

Alkali Rinse

	Post Carbon	Post Zeolite	Post Ion Exchange	Post All Three
COD	8,220	9,250	11,240	7,950
Total N	120	85	25	15

The budget cost of setting up filters online for

pH
Carbon
Zeolite
Ion Exchange

Would be £5- £10,000 depending on size.

Conclusion

Overall therefore, it appears that adsorption is the best route for on-site treatment. We would recommend the next phase to be an on-site pilot set up of this nature as a demonstration.

16

Attachment L
Statutory Requirements
Punch Industries
Revised IPC Licence Application

CONTENTS

1.0 REQUIREMENTS OF SECTION 83(5) OF THE ENVIRONMENTAL PROTECTION AGENCY ACTS 1992 AND 2003

Part IV of the Environmental Protection Agency Act (No. 7 of 1992) was replaced by a new Part IV under Section 15 of the Protection of the Environment Act 2003 (No. 27 of 2003). Under Section 83 (5) (a) (i) to (v) and (vii) to (x) of the Environmental Protection Agency Acts 1992 and 2003 (as defined in Section 1 of the Protection of the Environment Act 2003), the Agency shall not grant a licence or revised licence for an activity unless it is satisfied that the operation of the plant meets certain requirements. This section describes how the operation will meet these requirements.

1.1 Air

Section 83 (5) (a) (i) of the Environmental Protection Agency Acts 1992 and 2003 states that the Agency may not grant a licence for an activity unless it is satisfied that any emission from the activity will not result in the contravention of any air quality standard specified under the Air Pollution Act 1987 (No. 6, 1987).

Air quality standards as specified under Section 50 of the Air Pollution Act 1987 are contained in the Air Quality Standards Regulations S.I. No. 244 of 1987, and concern Sulphur Dioxide, Suspended Particulates, Lead and Nitrogen Dioxide. These standards are being replaced on a phased basis, completed in 2010, by the Air Quality Standards Regulations 2002 (S.I. 271 of 2002), which also bring in standards for NOx and Benzene.

Punch Industries has implemented an Environmental Management Plan, one of the objectives of which is that air quality is not compromised. Sources including boiler emissions and fugitive emissions are considered in the plan.

PARAMETER	PUNCH INDUSTRIES COMPLIANCE
Sulphur Dioxide ($S0_2$)	Boiler emissions are considered to be the only possible source of SO_2 at Punch Industries. Since the only fuel used is natural gas, it is expected that boiler emissions would be virtually free of SO_2
Nitrogen Dioxide ($N0_2$)	Boiler emissions are considered to be the only significant source of $N0_2$ on the Punch Industries site. Monitoring of $N0_2$ from boilers is not required to be carried out under the current IPC Licence,
Suspended Particulates	Some emissions of particulates would also be expected to occur within the boiler emissions. Monitoring of particulates from boilers is not required to be carried out under the current IPC Licence, however exceedances of the relevant ambient air quality standard is not expected to occur as a result of particulate emissions from Punch Industries.

Lead	Lead is not used in Punch Industries Ltd's process and therefore no emissions of lead occur.
Benzene	Benzene emissions are not expected to occur within the boiler emissions which use natural gas as fuel.

Although air emission limit values are specified in European legislation, it is understood that no emission limit values have been specified under Section 51 of the Air Pollution Act 1987.

1.2. Water Quality Standards

Section 83 (5) (a) (ii) of the Environmental Protection Agency Acts 1992 and 2003 states that the Agency shall not grant a licence for an activity unless it is satisfied that any emission from the facility will not result in the contravention of any standard prescribed under Section 26 of the Local Government (Water Pollution) Act 1977 (No. 1 of 1977).

Section 26 of the Water Pollution Act 1977 allows the Minister to set quality standards for water, trade effluent and sewerage. The Local Government (Water Pollution) Act 1977 (Water Quality Standards for Phosphorus) Regulations, 1998 (S.I. 258 of 1998) are the only quality standards set under this section. Phosphorus is not used at Punch Industries.

There are currently no other relevant water standards of relevant emission limit values made under this section. The subject of this section will be dealt with below in order to avoid duplication, since many of the limit values and standards currently in force were set in accordance with EC Directives.

1.3. European Legislation

Section 83 (5) (a) (iii) of the Environmental Protection Agency Acts 1992 and 2003 states that the Agency shall not grant a licence for an activity unless it is satisfied that any emission from the activity will comply with, or not result in the contravention of any relevant standard including any standard for an environmental medium prescribed under Regulations made under the European communities Act, 1972 or any other enactment.

The following regulations have been reviewed:

REQUIREMENT	PUNCH INDUSTRIES COMPLIANCE
Quality of Bathing Waters Regulations 1992-2001 (Sol. 155 of 1992, S.I. 145 of 1994, S.I. 177 of 1998 and S.I. 22 of 2001).	Punch Industries does not discharge any emissions directly to bathing water.
The European Communities (Quality of Salmonid Waters) Regulations (S.I. 293 of 1988)	Punch Industries does not discharge any emission directly to salmonid water. The closest listed salmonid river is the River

	Lee and Punch Industries does not discharge to this river.
Local Government (Water Pollution) Act1977 (Control of Cadmium Discharges) Regulations (S.I. 294 of 1985)	Cadmium is not used at the Punch Industries facility; therefore, there is no potential for discharges containing cadmium from the site. If substances containing Cadmium were to be used at Punch Industries in the future, controls would be applied to prevent any discharges containing these substances.
Local Government (Water Pollution) Act.1977 (Control of Hexachlorocyclohexane and Mercury Discharges) Regulations (S.I. 55 of 1986)	Hexachlorocyclohexane and mercury are not used at the Punch Industries facility; therefore, there is no potential for discharges containing these substances. If substances containing hexachlorocyclohexane and mercury were to be used at Punch Industries in the future, these would be carefully controlled
Local Government (Water Pollution) Acts 1977 and 1990 (Control of Aldrin, Dieldrin, Endrin, Isodrin, HCS, HCSD and CHCL3 Discharges) Regulations 1994 (Sol. 348 of 1993)	The substances to which theses regulations apply are not used at the Punch Industries facility. If these substances were to be used at Punch Industries in the future, controls would be applied to prevent any discharges containing these substances.
Local Government (Water Pollution) Acts 1977 and 1990 (Control of Carbon Tetrachloride, DDT and Pentachlorophenol Discharges) Regulations 1994 (Sol. 245 of 1994)	The substances to which theses regulations apply are not used at the Punch Industries facility. If these substances were to be used at Punch Industries in the future, controls would be applied to prevent any discharges containing these substances.
Local Government (Water Pollution) Acts 1977 and 1990 (Control of Carbon Tetrachloride, DDT and Pentachlorophenol Discharges) Regulations 1994 (S.I. 245 of 1994)	The substances to which theses regulations apply are not used at the Punch Industries facility. If these substances were to be used at Punch Industries in the future, controls would be applied to prevent any discharges containing these substances.
Quality of Shellfish Water Regulations (S.I. 200 of 1994, amended by Quality of Shellfish Waters (Amendment) Regulations (S.I. 459 of 2001)	Punch Industries does not discharge any material to shellfish waters, as listed in the Schedule to these regulations.
Local Government (Water Pollution) Regulations, 1992 (Sol. 271 of 1992)	Punch Industries complies with water quality standards laid out in the IPC licence, which take into consideration limits set in these regulations

Water Quality (Dangerous Substances) Regulations, 2001 (S.I. 12 of 2001)	Of the substances listed in these regulations, toluene, xylene, dichloromethane, chromium, are present in substances used at the Punch Industries plant. However there are no discharges to surface waters. Hence it is not considered likely that exceedence of the relevant Water Quality Standards set out in S.I. 12 of 2001 for those substances would occur. If other listed substances were to be used at Punch Industries in the future, best available technology controls would be applied to ensure the minimal concentrations of any listed substances.

There are no direct emissions to groundwater and the possibility of accidental indirect emissions is prevented measures including the following:

- Bunding of bulk storage tanks and bunding of liquid material storage areas and procedures to ensure that bunding is adequate and of good integrity;
- Ensuring adequate storage space is available for waste awaiting disposal off-site in a dedicated waste management area that is of suitable construction to prevent a risk of surface and groundwater pollution. It should also be noted that no waste is disposed of on-site;
- Regular drain surveys to ensure the integrity of all underground piping for the transfer of chemicals and contaminated water in process and foul sewers, with a procedure in place to identify any potentially damaged lines and completion of necessary remedial work;
- All manholes identified, secured and are easy to use when required. In the event of an incident occurring on site or during an emergency, it is essential to be able to readily identify the source in order to manage the impact to surface and groundwater.

1.4. Noise Regulations

Section 83 (5) (a) (iv) of the Environmental Protection Agency Acts 1992 and 2003 states that the Agency shall not grant a licence for any activity unless it is satisfied that any noise from the activity will comply with or not result in the contravention of any regulations under section 106 of the EPA act. This section enables the minister to make regulations for the purpose of the prevention of limitation of noise, which may cause a nuisance.

Although no noise control regulations have been made, the EPA Guidance Note for Noise in Relation to Scheduled Activities recommend that to avoid disturbance the noise level at sensitive locations should not exceed a LAeq T value of 55 dBA during the daytime and a LAeq T value of 45 dBA at night-time. It also recommends that audible tones and impulsive noise at sensitive locations at night should be avoided.

The Punch Industries facility is located in an industrial estate with no adjacent noise sensitive locations. Noise monitoring (2003) indicated that Punch Industries may occasionally be above the recommended night-time level 48 to 52 dBA and 56 to 61 dBA above the day time level. However this was attributed to significant general plant background noise from adjacent facilities and road traffic noise from the nearby R623. The report had no specific recommendations in relation to activities on the site.

Significant Environmental Pollution

Section 85 (5) (a) (v) of the Environmental Protection Agency Acts 1992 and 2003 states that the Agency shall not grant a licence for an activity unless it is satisfied that any emissions for the activity will not cause significant environmental pollution.

All monitoring and measurements taken to date indicate that Punch Industries currently has no significant impact on the environment.

Production and Disposal of Waste

Section 83 (5) (a) (vii) of the Environmental Protection Agency Acts 1992 and 2003 states that production of waste should be prevented or minimised, and where waste is produced, it will be recovered, and where it is not economically and technically possible to recover it, be disposed of in a manner which will prevent or minimise any impact on the environment.

Good management principles employed in the facility strive to prevent or minimise where possible the production of waste at Punch Industries.

1.5. Energy

Section 83 (5) (a) (viii) of the Environmental Protection Agency Acts 1992 and 2003 states that energy is to be used efficiently in the carrying on of the licensed activity.

Energy use is monitored at Punch Industries and reported to the Agency annually in the Annual Environmental Report. Punch Industries is actively aiming to reduce the amount of energy used in the carrying on of the licensed activity through various Environmental Projects. Energy usage on the Punch Industries site is addressed under Attachment A.1. The overall target is to obtain annual reductions in utilities usage, including gas and electricity.

1.6. Accident Prevention

Section 83 (5) (a) (ix) of the Environmental Protection Agency Acts 1992 and 2003 requires that necessary measures be taken to prevent accidents in the carrying on of the

activity. In addition, it is required that where an accident occurs, its consequences for the environment are limited, and where there are consequences, these consequences are remedied.

Punch Industries is taking measures to prevent accidents in the carrying on of its operations. In addition, provision is in place to ensure that were an accident to occur, its consequences for the environment would be limited and appropriate remedies would be put in place.

1.7. Cessation of the Activity

Section 83 (5) (a) (x) of the Environmental Protection Agency Acts 1992 and 203 requires that necessary measures are taken upon the permanent cessation of the activity (including such a cessation resulting from the abandonment of the activity) to avoid any risk of environmental pollution and return the site of the activity to a satisfactory state.

On the cessation of the activity or any part of the activity, Punch Industries will take the necessary measures to avoid any risk of environmental pollution. In addition, Punch Industries will return the site to a satisfactory state. More details of how this is to be achieved are supplied in Attachment A.1 Section 16 of this IPCL Application.

Recovery is the preferred disposal method for waste produced by Punch Industries where this is technically and economically feasible. All wastes are disposed of in compliance with the Waste Management Act 1996 and associated regulations. Section H.2 of this application details arrangements for the recovery or disposal of the various wastes generated by Punch Industries.

2. DESIGNATED AREAS

The activity is not carried out on, or is located such that it is liable to have an adverse effect on:

- A site placed on a list in accordance with Chapter 1 of the European Communities (Natural Habitats) Regulations, 1994 (S.I. 94 of 1997);
- A site where consultation has been initiated in accordance with Article 5 of the EU Habitats Directive (92/43/EEC); or
- A European site as defined in Article 2 of the European Communities (Natural Habitats) Regulations.

Punch Industries is not located on an area designated for natural conservation.

There is no potential for emissions from the site to negatively impact on the surrounding environment as all potential emissions are controlled under the site's Integrated Pollution Control Licence. The only direct emission from the site is the storm water drainage system.

3. WATER QUALITY

As discussed above in Section 1.2 of this Attachment, the operation of Punch Industries is unlikely to have an adverse effect on water quality with respect to the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998. Requirements of Environmental Protection Agency (Licensing) (Amendment) Regulations 2004.

The Environmental Protection Agency (Licensing) (Amendment) Regulations 2004 (S.I. 394 of 2004) specify indicative lists of principal polluting substances to be taken into account by the Agency, if relevant, in the fixing of emission limit values.

The table below lists the polluting substances for Air and Water that are given in the Schedule to these regulations, with an indication of whether they are likely to be present in air and water emissions at Punch Industries.

Air emissions are discussed further in Section E.1 of this revised IPCL application while water emissions are discussed further in Section E.2 of this revised IPCL application.

MEDIUM	PRINCIPLE POLLUTING SUBSTANCE	PUNCH INDUSTRIES EMISSIONS
Air	Sulphur dioxide and other sulphur compounds	Unlikely to be present
Air	Oxides of nitrogen and other nitrogen compounds	Unlikely to be present
Air	Carbon monoxide	Unlikely to be present
Air	Volatile Organic compounds	Unlikely to be present
Air	Metals and their compounds	Unlikely to be present
Air	Dust	Unlikely to be present
Air	Asbestos suspended particulates, fibres)	Unlikely to be present
Air	Chlorine and its compounds	Unlikely to be present
Air	Fluorine and its compounds	Unlikely to be present
Air	Arsenic and its compounds	Unlikely to be present
Air	Cyanides	Unlikely to be present
Air	Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction via the air	Unlikely to be present
Air	Polychlorinated dibenzodioxins and Polychlorinated dibenzofurans	Unlikely to be present
Water	Organohalogen compounds and substances which may form such Compounds in the aquatic environment	Unlikely to be present

Water	Organophosphorus compounds	Unlikely to be present
Water	Organotin compounds	Unlikely to be present
Water	Substances and preparations which been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction via the aquatic environment	Unlikely to be present
Water	Persistent hydrocarbons Persistent and bio-accumulate organic toxic substances	Unlikely to be present
Water	Cyanides	Unlikely to be present
Water	Metals and their compounds	Present
Water	Arsenic and its compounds	Unlikely to be present
Water	Biocides and plant health products	Unlikely to be present
Water	Materials in suspension	Present
Water	Substances which contribute to eutrophication (in particular nitrates and phosphates)	Present
Water	Substances, which have an unfavourable influence on he oxygen balance (and can be measured using parameters such as BOD, COD, etc.)	Present

4.0 REQUIREMENTS FOR A FIT AND PROPER PERSON

Section 83 (5) (a) (xi) of the Environmental Protection Agency Acts 1992 and 2003 specifies that the Agency shall not grant a licence unless it is satisfied that the licensee is a fit and proper person. Information to enable a determination to be made by the Agency, as required by Section 84 (4) of the Environmental Protection Agency Acts 1992 and 2003, is given below.

4.1. Convictions

Punch Industries has not been convicted under the Environmental Protection Agency Acts 1992 and 2003.

4.3. Technical Knowledge and qualifications

The responsibility for the operation and control of treatment and abatement systems on site is that of the Environmental Operator, reporting to the Technical Manager. The Environmental Operator is supported in this role by the Lab Chemist.

The current Technical Manager holds a BSc in Chemistry, a Diploma in Applied Science (Fine Chemicals / Pharmaceuticals) and has a number of years of relevant experience. The post of Lab Chemist requires either a diploma or degree in a relevant subject, and appropriate experience. The current Lab Chemist /QA Specialist holds a BSc in Food Science the second hold will hold a BSc in Chemistry or the approved equivalent. The current Environmental Operator has extensive experience of the Punch Industries site and environmental management at the site. All lab staff receive an environmental induction, and depending on requirements, external and internal training courses are given as the need arises.

4.4. Resources

Punch Industries have resources to ensure that any financial commitments or liabilities that may arise can be met, including those that may arise through cessation of activities at the site. Punch Industries prepared a basic Residuals Management Plan (RMP) which is included as part of Attachment A.1 section 16. The RMP details the basic measures to minimise the impact of the closure of the facility and address the management and post closure care of any potentially polluting residuals. Note this is a basic RMP for the site a more detailed plan has not been completed, however this will be done if requested by the Agency.

Attachment X.1
Miscellaneous Information
Punch Industries
Revised IPC Licence Application

CONTENTS

Section **Page No**

Appendix. X.1

Changes to the facility since Granting the Original Licence

CHANGES TO THE FACILITY SINCE GRANTING THE LICENCE Oct 1996

ACTIVITY	YEAR	PI CORRESPONDANCE	EPA CORRESPONDANCE
New Boiler installed	2005	----------	----------
New Colour Catcher Plant Installed	2005	14/09/2004 10/01/2005 24/06/2005	28/10/2004 16/05/2005
Building of Fire Water Tank	2002	----------	----------
Approval for Colour Catcher Process	1999	23/02/1999 04/03/1999	16/03/1999
Building of Blow Moulding Area	2003	25/04/03	EPA Site Inspection Report 15/04/03
New Colour Catcher Plant Installed	2001	----------	EPA Audit Report 01/05/01
Notified EPA of CC Process	1996		Ref in PI doc 31/05/03 Envirotech report mentioned

Appendix. X.2

Notes on Methods of Analysis

INTERFERENCES IN ANALYTICAL METHODS

ACTIVITY	PUNCH CORR	DATE APPROVED BY AGENCY	
Discontinue use of standard colorimetric analysis.	01/05/02 31/05/03 17/09/02 (advised to EPA by (Envirotech Analytical consultants)		Note 1
Measure BOD annually	PI 18/06/98	15/07/98	
Nitrogen analysis	PI 01/05/02	Enviro report 11/02/02	

Note 1

It was the opinion of Envirotech Analytical Consultants to ~Punch Industries having carried out extensive analysis that the standard colorimetric methods used were not suitable for samples from Punch Industries. These methods are typically based on conversion of all forms of Nitrogen to Nitrate followed by colorimetric determination of the Nitrate.

One of the processes at Punch Industries produces an effluent containing a complex chemical based on a QAC. Based on test results, they concluded that this interferes with the colorimetric method commonly used.

As an alternative, they carried out extensive tests using Ion Chromatography (for Nitrate and Nitrite) and Kjeldahl Nitrogen (for organic Nitrate and Ammonia) methods. Combining these gives the total Nitrogen result.

This view was based on methods taken from "Standard Methods for the Examination of Water and Wastewater" 20th Edition, Published APHA, AWWA & WEF 1998).

- (Method No 4500-Norg. C) Kjeldahl Method
- (Method No 4110 Ion Chromatography

Thus in order to avoid breaches of the Punch Industries IPC Licence for what may have been the result of analytical interference this was communicated to the Agency on 17/09/02. Reference is made to having received permission from the Agency to change to the new method in PI correspondence of 06/02/04.